Still Forklift 7032 34 38 40 48 50 Electrical Installation

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Workshop Manual 7032 - 34 / 38 - 40 / 48 - 50

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Electrical installation

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Technical Data for Maintenance Service

Accelerator pedal control transmitter potentiometer Angle of rotation sensor, hydraulics potentiometer Current draw: start approx. 160 A / 400 rpm Drive motor field excitation 12 - 35 A (40A) Current limit/amature current 460 A max. adjustable up to 22 km/h max. optional equipment Travel speed reduction adjustable up to 22 km/h max. optional equipment rate of braking power can be selected by means of a 5-stage rotary switch Contactors 1K3, 1K4 12 Volt (5.06 ohms) Fuses for - 90 wer board (LET) - Master board 1F3 - 60 A (LET) - 16 A - 172 - 5 A - Pocb. 9A2 diesel engine shut down controller 1F17 - 5 A - 5 A - Pcb. 9A2 diesel engine shut down controller 1F17 - 5 A - 5 A - Pcb. 9A2 diesel engine shut down controller 1F17 - 5 A - 5 A - Pcb. 9A2 diesel engine shut down controller 1F17 - 5 A - 5 A - Pcb. 9A2 diesel engine shut down controller 1F17 - 5 A - 250 A - F2, F5 - 20 A - 25 A - 25 A - 25 A - Contactor control panel A 5 9F4 - 250 A - 25 A - Starter batteries	Electronic SCR Drive Control (puise controi system)		Stilltronic R70
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Starter batteries GI, G2 2 batteries, 43Ah — 210A (VW -/ MB-Motor) Starter batteries GI, G2 2 batteries, 43Ah — 320A (DEUTZ-Motor) Excitation generator/ motor field transistorized 24-volt power section Electronic rpm regulation, engine TFG (LPG): throttle positioning solenoid DFG (Diesel): servomotor for injection pump DFG : EMR / DEUTZ-Motor Insulation resistance Electrical equipment (motor/generator circuit) Electrical machines Io00 ohms/ volt — approx. 190 kohms Electrical rotection, construction complying with DIN 40050 Electrical equipment: IP 54	Alternator 9G2		28 volts / 55 A
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Electrical equipement: IP 54	Electrical protection, construction complying with DIN 40050		
Stand: 1/02 (Ersatz für Stand:) 002	Electrical equipement: IP 54		

Electrical installation

Mechanical configuration

The electrical installation is composed of two main sections.

- **1** The **SCR control equipment** is mounted to the front cowling on the RH side. It consists of:
- power board P.C.b.
- drive control p.c. b.
- engine starting via generator p.c. b.
- throttle positioning solenoid (TFG=LPG model)
- p.c.b.- servomotor (DFG=diesel model)
- p.c. b.- electronic charge compensating/ balancing device (TI'G=LPG model)
- p.c.b.- shut-down solenoid (DFG=diesel model)
- p.c.b.- control circuit fuse ffG=LPG model)
- Master Board (base plate)
- **2** Protected by a cover, the **contactor panel** is located on the LH side and is accessible from unter the engine bonnet. Mounted on the contactor panel are:

- contactor, driving	1 K4
- contactor, starting	1 K3
- p.c.b. with current sensor	1A6/1 U1
- glow plug relay (DFG=diesel model)	9K3



The components listed below also belong to the electrical installation (see illustration page 4)

A. Dash panel comprising

3	keyswitch	S1
4	directional control switch	
	for fwd - neutral - rev.	1S1
5	hour meter	6P1
6	5-stage switch	1S14
	various indicator lights	
7	horn button in the steering	
	wheelhub	4S1
_		
В.	Within the front cowl arealleg	
СС	mpartment:	
1	electronic contro! unit	A4
8	accelerator pedal control	
	transmitter (floor plate)	1B1
-		

9 brake switch 1S12 (front cowling, LH side) warning horn 4H1

10 (front cowling, LH side)

С.	Drive motor/Generator	
	- brush wear monitoring	
11	tachogenerator	6B7
12	2 rpm sensor	6B9
D.	Under the engine bonnet	
13	3 starter batteries G	1/G2
14	servomotor for injection pump	
	(DFG=diesel model)	9M7
2	contactor panel '	A5
15	ignition system (7G=LPG model)	
16	throttle positioning solenoid	
	(TFG=L13G model)	9Y3
17	alternator	9G2
18	preheat resistor	
	(DFG=diesel model)	9R8
19	shut-down solenoid	9Y5
20	angle of rotation sensor, hydraulics 2R2	
21	parking brake switch	1S4

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Electrical installation



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General Description

Electrical supply is by means of two 12-volt/43 Ah starter batteries which are wired in series.

The 28-volt/10/55 alternator supplies exciting current to the power board for generator and drive motor.

The supply voltage for the printed circuit boards (5/15 volts) is generated in the power board and the printed circuit board respectively.

There does not exist an electric starter as generator «IGII is the means of starting the engîne.

Connections between d.c. generator and drive motor are the bipolar type, Le. they are completely isolated electrically from truck frame. Wiring conforms to VDE 0100 standards. Also of the bipolar type, the electrical connections between power board and excitation windings of drive motors and generator are not grounded. The remaining wiring is of the unipolar type.

Electrical installation

Routing ot truck cables meets VDE 0117 requirements. All control voltages are with negative against the body (frame).

There are differences in the electrical system o diesel and LPG powered models, viz .:

DM (diesel model)

- glow plug system
- servomotor for injection pump
- p.c.b. for servomotor
- p.c.b. for shut-down solenoîd
- shut-down solenoid

TFG (LPG model)

- control unit for 12-volt ignition system!
- throttle positioning solenoid
- p.c.b. for throttle positioning solenoid
- p.c.b. for control circuit fuses
- 12-volt central tapping between batteries
- charge balancing/compensating circuit for batteries

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- shut-off valve



Insulation test

Preparation for testing

Before carrying out test: Disconnect or rernove all printed circuit boards incorporated in electronic control unit, and then disconnect connectors

X5 (power board IA2) and

X22 (p.c.b. 9A2 diesel engine shut down controller/p.c.b. A7 control circuit fuse).



Testing the insulation resistance (earthing)

After any repair work on electric components on contactor panel and/or electrical machines (generator/ drive motor) it will be necessary to test the insulation resistance before installation or putting the truck back into service again.

The insulation material used on the truck must have a resistance of a least 190 000 ohms (190 kohms).

Testing against the body - figures 1, 2, 3, 5 and 6

Testing armature and stator against field winding - figures 4 and 7

Check armature and stator of both drive motor and generator and associated leads in the circuit.

The test should be carried out by applying a d.c. voltage of 500 volts at the minimum. The megger (e.g. Isolavi 8) used for checking for earthing must supply a current rating of at least 1 mA.





Drive controls

Keyswitch S1

Located on the RH section of the dash panel on the steering column, keyswitch S1 is operated with a removable key to prevent unauthorised use of the truck.

The keyswitch is used for starting the engine and operating the electrical equipment belonging to the engine.

The keyswitch incorporates a starter safeguard lock preventing the key from being turned to the "START" position once the engine has started.

It is only after the key has been turned to the 'OFF' position and the engine has stopped turning that a second attempt to start the engine can be made.

The keyswitch has 3 positions:

0 = '**OFF**'. **1** = '**ON**', **2** = '**START**' (key turned clockwise)

When released from the 'START' position the keyswitch will automatically return to the 'ON' position.

The keyswitch has 3 connections on its reverse:

- 30/S1 supply line from pos. (+) battery terminal (24 volts)
- 50/S1 p.c.b. 9A4 'engine starting via generator' supplied with battery voltage in 'START'position of keyswitch
- 15/S1 the electrical system is supplied with battery voltage in 'START' and 'ON' position of keyswitch

Starting

The starting operation can only be carried out with directional control lever in neutral and engine completely stopped. The engine will start with a delay of around 1 sec.

The rieutral position is indicated by indicator light H3. Indication of 'preglow' is by start indicator lamp 6H12 (diesel model).

Turning off the engine

Turn key S1 to the 'OFF' position. The engine of LPG model will continue running until total consumption of residual gas quantity! (see: relay 9K4).









Still Forklift 7032 34 38 40 48 50 Electrical Installation

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Drive controls

Directional control switches

Manual change of direction of travel Well protected by the dash panel, the switch assembly controlling the direction of travel is mounted on a base plate welded to the steering column.

The double-type directional control lever is supported on a die-cast bracket. The direction switch can be switched to 3 positions:

"forwards" - "neutral" - "reverse"

The directional control lever is locked in the different spring-loaded positions by a notch and cam with roller. Arranged between the two bearing points of the bracket, a plastic switching segment on the direction control lever actuates the following waterproof microswitches (2):

1S1	 forwards
1S2	- reverse
1S15	- neutral

Microswitches

Rest position: contact 1 - 2 closed

contact 1 - 4 open

Note: Earlier models are fitted with standard microswitches that are not waterproof. Both microswitch designs are interchangeable.

Two-pedal control

(one pedal for each direction of travel)

The accelerator transmitter 1 Bl is operated by two pedals (one for forward travel, the other for reverse travel) mounted on a common shaft together with a lever (H).

This lever comprises a return spring (**F**) which ensures that both pedals upon being released automatically retum to the initial or rest position. The pedals are mechanically linked to a rocker (S) via control rods (Z). Located on the rocker and provided with appropriate notches, cam (N) operates the waterproof microswitches 1S1, 1S2, 1S15, causing them to actuate.

The control rods must be adjusted so that the stroke of the rocker ist 18 mm, pedal travel being 5 +/- 2 mm.

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Microswitches Rest position:

contact 1 - 2 closed contact 1 - 3 open







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